

ASSESSING DOSES TO HUMANS IN THE POSIVA SAFETY CASE

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In Finland, Olkiluoto Island on the western coast has been selected as a repository site for spent nuclear fuel disposal. With approaching licensing steps, application for nuclear construction licence in 2012, all components of the long-term safety assessment of the repository is becoming more site-specific. This concerns also the dose assessment, which is a key part when assessing compliance with regulatory requirements on the long-term safety. It is required that the implementor of the repository shall demonstrate that the annual doses to the most exposed people remain below the value of 0.1 mSv and that the average annual doses to other people remain insignificantly low. A prospective deterministic dose assessment, based on the ICRP concept of assessing doses of the representative person, has been developed and applied in the 2009 interim safety case. The exposure characteristics are based on site-specific conditions, regional land use and present human habits. The site is located in a region with significant postglacial land uplift and the temporal scale of the assessment spans several thousands of years; this results in that the surface environment will undergo significant development and many generations may be exposed. To facilitate the assessment of doses to both the most exposed people and other people at this dynamic site, full dose distributions are derived. A dose distribution comprises the dose to each potentially exposed person utilising the contaminated area for each generation during the assessment time window. Separate dose distributions are derived for each calculation case with radionuclide releases from the repository. The most exposed group and a group representing other people are then identified from the derived dose distributions and the corresponding annual doses to representative persons for these two groups. This contribution presents and discusses the methodology applied in the interim safety case to derive annual doses to humans from concentrations of radionuclides in environmental media, resulting dose distributions from the calculation cases analysed, and the doses used in the compliance assessment with regulatory radiation protection criteria regarding the long-term safety.